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REVIEWS

Flora of the Santa Cruz Mountains of California. A manual of the vascular plants. By John Hunter Thomas. viii + 434 pages, 249 figs. and 16 photos, 1 map. Stanford University Press, Stanford, California. 1961. \$8.50.

The first impression, upon taking up the "Flora of the Santa Cruz Mountains," is of an attractive, well-designed book with clear typography, generous spacing, indented keys, good illustrations, and with an adequate binding. The Stanford University Press is to be congratulated upon producing a volume of exceptionally fine appearance.

Although the book is entitled "Flora of the Santa Cruz Mountains," it encompasses the whole San Francisco peninsula, and thence southward to the Pajaro River and from the ocean east to the middle of the Santa Clara Valley. Coverage is comprehensive, including both native and introduced plants. The number of kinds of introduced plants occurring spontaneously is amazing; 31 per cent of the 1799 taxa listed fall into this category.

For each of the species listed, Thomas gives the scientific name, common name, habitat, localities in the area, time of blooming, and place of origin for introduced species. Sometimes elevation is given and, occasionally, associated species. Brief comments, often on taxonomic problems, are made for some species. Synonyms are included only for convenience in referring to the same taxon in other regional and sectional floras. Specimens are not cited except in a few instances. There are no new names or combinations.

The flora is written for the serious beginner as well as the trained botanist. The beginner, especially, will appreciate the 250 line drawings which are from the "Illustrated Flora of the Pacific States." As a result of better spacing and better paper they are clearer and more attractive than many of the original reproductions in the Illustrated Flora. The common names also appear to correspond to those used by Abrams. Possibly the influence of the latter flora may be responsible in part for the recognition of certain families, for example, Melanthaceae, Parnassiaceae, Hydrangeaceae, Grossulariaceae, Amygdalaceae, Malaceae, Mimosaceae, Caesalpinaceae, Monotropaceae, Pyrolaceae, Vacciniaceae, Convallariaceae, Amaryllidaceae, all of these segregated from the Liliaceae, Saxifragaceae, Rosaceae, Fabaceae, and Ericaceae. Nevertheless, Thomas' taxonomic concepts are, in general, conservative. For example, *Berberis* rather than *Mahonia* is recognized; *Montia exigua* is considered as synonymous with *M. spathulata*; ssp. *decurrens* of *Eriogonum nudum* is not recognized. However, *Dudleya* (not *Echeveria*) and *Horkelia* are used; *Allium breweri* is considered distinct from *A. falcifolium*; and all the forms of *Arctostaphylos* in the Santa Cruz Mountains are accorded specific status. The varietal designation is usually employed rather than the subspecific except when the latter designation has been used

in a recent monograph. The arrangement of families in general follows the sequence proposed by Engler and Prantl.

Part I consists of 33 pages of introductory material and 13 pages of keys to the divisions, classes, subclasses, and families. A map shows place names and supplements the description of the area. The geology (4 pages including a stratigraphic profile) is discussed by Dr. Earl E. Brabb. Monthly and yearly average temperatures and average rainfall are given for seven stations. Classification of the vegetation follows Munz and Keck insofar as it may be applied to the Santa Cruz Mountains. The more characteristic plants are listed for each of the plant communities, and photographs illustrate most of them.

Ten pages are devoted to a discussion of the composition and relationships of the flora. The number of native species is approximately 1246 in the Santa Cruz Mountain area of 1386 square miles, compared to 1004 in Marin County (529 square miles), 700 in the Mount Hamilton Range (1500 square miles), and 530 on Mount Diablo (55 square miles). Five distributional patterns are recognized, whereas Campbell and Wiggins recognized 16 for the whole state. Endemic in the area are 10 species, 3 subspecies, 11 varieties, 2 forms, and 1 hybrid. Some are closely restricted to certain geological formations.

Lists, together with localities, are given: 1) of taxa reaching their southern limits of distribution in the area, 2) of taxa reaching their northern limit, 3) of those with affinities with the inner Coast Ranges, 4) of the more obligate serpentine taxa, and 5) of plants with a disjunct distribution to the north. Plants of sandhills and marshes are also discussed. The list of taxa with "their northern limits of distribution in the Coast Range in the Santa Cruz Mountains" applies to the "Outer Coast Ranges" only, as seven species are included which occur somewhat farther north in the Inner Coast Range, on Mount Diablo. These are *Anemopsis californica*, *Malacothamnus hallii* (*Sphaeralcea fasciculata*), *Osmorrhiza brachypoda*, *Linanthus ambiguus*, *Pholistoma membranaceum*, and *Salvia mellifera*.

Of the 34 taxa occurring in the Santa Cruz Mountains, but regarded by Thomas as being typically species of the Inner Coast Ranges, 24 grow in the Mount Hamilton Range. Only 19 are on Mount Diablo, 13 of which are common to Mount Diablo and the Mount Hamilton Range. Whether *Helianthella castanea* should be considered a plant of the inner ranges is debatable.

Thomas' list of "the more obligate local serpentine plants" (p. 31) caused the writer considerable surprise, as a number of plants which are common and widespread on Mount Diablo are included. The following species are not associated in the writer's mind with serpentine although the records indicate that they may, at times, grow on serpentine: *Festuca pacifica*, *F. reflexa*, *Koeleria macrantha* (*K. gracilis*, *K. cristata*), *Calochortus venustus*, *Allium serratum*, *Lewisia rediviva*, *Astragalus gambellianus*, *Sanicula bipinnatifida*, and *Rigiodipappus leptocladus*. Of the remaining taxa, more than half commonly or often grow on serpentine, but are by no means limited to it. Ten or fewer may be truly obligate serpentine plants. Perhaps there is here a difference of opinion as to the interpretation of the phrase "more obligate." However, the list does include species of rather widely differing ranges of tolerance with respect to the substratum and soils. Further observations on the relation of serpentine tolerant species to their substratum need to be stimulated.

Part I closes with a brief résumé of the history of botanical collecting in the area. Photographs of six collectors are presented. The annotated catalogue of vascular plants comprises Part II. Part III consists of a list of 34 general references and a glossary of technical terms. Part IV consists of an index of place names, an index of common names, and an index of scientific names.

The "Flora of the Santa Cruz Mountains of California" presents a synthesis of the present knowledge of the flora of the Santa Cruz Mountain area based on many collections by others as well as by Dr. Thomas. It represents a great deal of work and is a worthy volume which does credit to its author and will be useful to many. In conclusion, we will all, I am sure, concur wholeheartedly with the author's wish

that, by acquainting more people with the plants around them, this volume will serve as "a stimulus, however slight, toward more permanent protection of our environment."—MARY L. BOWERMAN, Department of Botany, University of California, Berkeley, California.

Principles of Plant Breeding. By R. W. ALLARD. xi + 485 pp. John Wiley & Sons, Inc. New York and London. 1960. \$9.00.

In the Preface, the author states that "Principles of Plant Breeding" is designed primarily to serve as an undergraduate text for students in agriculture. The aim of the book is to stress principles, and to illustrate them with appropriate examples. This task has been accomplished with a high degree of competence. Allard writes with clarity, precision and force. For this reason it should not be difficult for an undergraduate with some training in biometry, and a semester course in genetics, to follow his closely reasoned explanations and interpretations. The entire book is arranged to serve as a text for a two-semester course, but it is conveniently segmented so it can be adapted to the needs of a one-semester or one-quarter course. In addition to its pedagogical function, this book can be studied with profit by the professional plant breeder. It will serve to broaden his outlook and invigorate his research.

The material used to illustrate the principles is slanted to some extent towards cereal and forage crops, but this is not unnatural. More thorough information about plant breeding techniques and procedures is available for this group of crops than for fruit, vegetable, fiber or ornamental crops. A few more examples could, however, have been drawn from cotton and possibly other crops.

As one could anticipate, knowing his interests, the author is particularly sure-footed and lucid in chapters concerned with quantitative genetics, population genetics, systems of mating and heterosis. But other sections, for example, "Breeding methods with cross-pollinated crops," "Breeding for disease resistance," and "Polyploidy," are also discussed with equal skill.

This reviewer can suggest only one feature that would perhaps increase the usefulness of the book. A set of carefully composed questions and problems at the end of each chapter might serve as a source of understanding and stimulation. This has been done to some extent by inserting questions in the legends of a few figures. More complete development of this aspect might add to the teaching value of the book.

The references are not copious, but adequate for the purpose. The book is notable for an unusually low incidence of typographical errors. A glossary of terms used in plant breeding and a good index add to its serviceability.

It has taken time for plant breeding to bridge the gap between art and science. "Principles of Plant Breeding" is likely to be marked as a significant milestone in establishing plant breeding as a full-fledged scientific discipline.—THOMAS W. WHITAKER, U. S. Horticultural Field Station, La Jolla, California.

NOTES AND NEWS

The Smithsonian Institution is reprinting Paul C. Standley's *Trees and Shrubs of Mexico*, Contr. U. S. National Herbarium, vol. 23, 1920-26, Parts 1 (pp. xviii + 1-169), 2 (xxxvii + 171-515), 3 (pp. xxviii + 517-848), and 5 (ii + 1313-1721), in 2 paper-bound volumes containing pts. 1-3 and pt. 5, respectively. The price of these 4 parts is \$20, postpaid. Part 4 (pp. xxxiv + 849-1312), which is available in the original 1924 edition published by the U. S. National Museum, will be enclosed free of charge. Orders should be accompanied by check and should be addressed to: Publications Distribution Section, Smithsonian Institution, Washington 25, D.C.